

## Introduction

NMFS allowed 60 days following the July 27, 2000, release of the Draft FCRPS Biological Opinion for interested parties to comment on the document. We received 35 comment letters from parties other than the Action Agencies with thousands of pages of comments and supporting documentation. We have carefully reviewed and considered all comments received. Where appropriate, we respond to specific comments in the body of the final biological opinion. This short paper describes the key issues raised in the review and how NMFS and the Action Agencies responded in the final opinion. <sup>1</sup>

With thousands of pages of comments and supporting documentation it is not practical to respond individually to each comment. Rather, we have attempted to categorize the comments received and have formulated responses to address as many of the specific issues under each category as practical. Some comments we received were so general that no response is possible (e.g. "... statistics used in the document seem to be skewed ..."). Wherever possible, we respond to similar comments from various parties under a single topic.

The following is a brief list of major changes in the final biological opinion.

- **Section 1** We revised the scope of the final biological opinion to exclude BOR's 11 Snake River basin projects due to ongoing negotiations with third parties that could affect the proposed action for these projects. Consultation is ongoing but suspended until these negotiations are either completed or abandoned. We strengthened the jeopardy standards.
- **Section 6** We substantially revised the extinction risk and recovery probability calculations. These revisions generally respond to concerns that the analysis contained in the July 27, 2000 draft biological opinion was not sufficiently conservative.
- **Section 7** We have expanded the discussion of cumulative impacts to briefly describe major non-Federal actions that may affect listed species.
- **Section 9** We revised Sections 9.2 and 9.7 to conform with modified assumptions and calculations regarding extinction risks and recovery probabilities included in Section 6. We changed Section 9.2 to more clearly articulate the performance standards for evaluation of implementation in 2003, 2005, and 2008. Section 9.5 was changed to clearly define the mid-point check-ins and the consequences of failure in implementation or listed fish stock performance.

---

<sup>1</sup> Unless otherwise noted, 'final opinion,' 'the opinion,' 'this opinion,' 'biological opinion,' and all 'section' references all refer to the Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin, signed December 21, 2000.

- **Section 9.6** We developed greater specificity for prescribed offsite habitat (Section 9.6.2), harvest (Section 9.6.3), and hatchery (Section 9.6.4) reasonable and prudent alternative (RPA) measures. Some of the RPA measures were modified to conform with Action Agency concerns (primarily time frames allowed for implementation) and the concerns of other agencies.

### **Jeopardy Standards and Life Cycle Effects of the Proposed Action, Reasonable and Prudent Alternative, and Four-Dam Drawdown Alternative**

NMFS received numerous comments on the jeopardy standard indicator criteria and on calculations and assumptions used to evaluate the ability of the proposed action and RPA to meet those criteria. These comments were wide-ranging, including: the choice of metrics, underlying assumptions, calculation methods, and the reasonableness of the conclusions reached. Throughout the final biological opinion we acknowledge the comments received, describe how the analysis was modified in response to those comments, and/or, as appropriate, give our rationale for not changing the criteria or analysis. The comments generally fell into four broad categories.

**Comment** *NMFS should choose more conservative jeopardy standard indicator criteria.*

**Response** In response to comments, NMFS modified the recovery indicator criteria by requiring that stocks for which no interim recovery level currently exists achieve a population growth rate greater than 1.0. In the draft opinion, these stocks only had to meet the survival criterion, which could be achieved in some cases with a continued declining trend. Funding for Technical Recovery Teams to develop recovery levels for all populations within 3 years is included in the RPA, so that the recovery indicator criteria could be evaluated for all populations before the 5-year check-in. In response to comments, we dropped the “full mitigation” criterion. We did not change the survival criterion in response to suggested alternatives. Our rationale is included in Section 1.1.3. We evaluated the sensitivity of results to alternative survival thresholds and incorporated this by reference into the biological opinion. We also evaluated a more conservative level of acceptable extinction risk (1%), but found that it had little impact on results.

**Comment** *NMFS should modify the estimation methods used to evaluate the jeopardy standard indicator criteria. These comments dealt with such concerns as “start date” bias, use of recent adult and jack returns, and the effectiveness of hatchery-origin spawners.*

**Response** In response to comments about the time period chosen to characterize current extinction risk for the survival indicator criterion, NMFS dropped 2002-to-2004 projections from the analysis, but retained preliminary return information for 2000 and projected returns from this year’s jack counts for two ESUs. We did not change the 1980 starting year for reasons described

in Section 6.1.2. The biological opinion now includes the full 20%-to-80% range of historical hatchery-origin spawner effectiveness in all analyses, rather than rejecting the 80% estimate, as was done in the draft opinion. Comments also convinced us that the most reasonable range of historical hatchery-origin spawner effectiveness for the Imnaha River spring/summer chinook stock is 50% to 80%. In response to comments about the use of Snake River steelhead A-Run and B-Run aggregates, we included an analysis of pseudo-populations with abundance levels 10% and 33% of the aggregates. We received many comments on the methods used to estimate population trends. We believe that most have been answered with the current methods, but include a provision in the RPA to collaboratively review population trend estimation methods prior to the 5-year check-in and, if appropriate, to modify them.

**Comment** *NMFS should use less optimistic assumptions when evaluating the ability of the RPA to meet jeopardy standard indicator criteria.*

**Response** In the final biological opinion, NMFS considers the full range of assumptions regarding delayed mortality of non-transported fish (near 0% to as high as 74% mortality), rather than rejecting the upper end of the range, as was done in the draft opinion. We did not reject the low end of the range, as suggested in several comments, for reasons described in Section 6.3. In response to concerns about mixing PATH and SIMPAS passage model results to estimate the base-to-current juvenile passage survival change, we modified this approach and added a second method that is based solely on PATH results. In response to concerns that our analysis assumes immediate achievement of all survival improvements, we included sensitivity analyses to evaluate the effects of delay for three ESUs. These results are considered qualitatively in reaching conclusions. Commenters pointed out that the survival change associated with reduced Snake River fall chinook harvest rates, which was based on PATH analyses in the draft opinion, was not consistent with estimates derived from other agencies. An analysis based on Pacific Salmon Commission modeling was added, and both the PATH and PSC results are included in the analysis. In response to comments regarding estimates of juvenile and adult passage survival changes associated with the RPA, both the SIMPAS juvenile survival estimates and the adult survival improvement estimates have been modified.

**Comment** *NMFS should use more optimistic assumptions when evaluating the ability of breaching to meet jeopardy standard indicator criteria.*

**Response** NMFS used identical assumptions for each action, with the exception of evaluation of the delayed mortality of nontransported fish. We assume that the current level of delayed mortality of nontransported fish will not change with the proposed action or the RPA. This assumption is also evaluated for breaching. However, we also evaluate two much more optimistic assumptions for breaching. We include the assumptions that delayed mortality is currently very high and that it will be reduced by either 50% or 100% after breaching four dams. The three alternative assumptions for breaching are displayed more clearly in the biological opinion and the results are discussed with respect to these assumptions. In response to comments

that additional Snake River fall chinook spawning habitat did not affect survival in the quantitative analysis, we discuss this as a qualitative improvement but defer to PATH's analysis indicating that increased survival was unlikely to occur until abundance increased closer to the carrying capacity of the currently available spawning area.

## **Reasonable and Prudent Alternative**

### **Hydro Measures**

#### ***Fish Protection Facilities and Operations***

**Comment** *Spill and sluiceway passage is preferable to collection and transportation.*

**Response** Transporting juvenile fish around dams avoids mortality associated with dam and reservoir passage. Transport survival studies indicate that juvenile spring/summer chinook and steelhead transported from Lower Granite Dam survive and return at higher rates than inriver migrants. Three years of study failed to identify similar benefits for spring migrants transported from McNary Dam. These studies also suggest that post-Bonneville mortality (delayed mortality) is higher for transported fish than it is for inriver migrants. We consider the currently available scientific information sufficient to support the current transportation program, but the extent of increased delayed mortality caused by transportation remains a critical uncertainty. Not all fish are transported, however, and nontransported juvenile fish migrate inriver. Therefore, NMFS agrees with the views of the state fisheries agencies, Tribes and the Independent Science Advisory Board on this matter, and in this RPA continues to "spread-the-risk" by improving passage conditions (e.g. spill, bypass improvements, removable spillway weirs) for inriver migrants and by prescribing additional studies to improve our understanding of the comparative survival benefits of collection and transportation and inriver migration.

The opinion does not provide for summer spill at collector projects at this time, opting instead for maximum transportation of summer migrants (fall chinook). Survival rates for fall chinook migrating inriver are quite low. Some have argued that this poor survival for summer inriver migrants is due, in part, to the fact that without spill, dam passage requires turbine passage which is known to cause mortality. It has not previously been possible to measure the benefits of transportation compared to inriver survival for Snake River summer migrants due to inadequate numbers of test fish. We now have enough test fish but transmission system constraints currently limit the ability to spill throughout the FCRPS during the summer to facilitate a complete study. The RPA takes advantage of this opportunity by calling for studies to evaluate the transportation of summer migrants to begin immediately. These studies will evaluate no-spill conditions in 2001–2003 then begin the evaluation with spill in 2004.

Preliminary studies have shown that surface bypass systems have high passage efficiencies at

## RESPONSE TO COMMENTS

December 21, 2000

some dams. The RPA prescribes development and construction of a corner collector surface bypass system at Bonneville Powerhouse Two. It also calls for further evaluations of such systems (e.g. sluiceways, removable spillway weirs) at Lower Granite and John Day dams. If these facilities are shown to be effective at these projects, then NMFS would require installation of such systems at other FCRPS projects.

**Comment** *NMFS should require higher spill rates, 24-hour spill, and longer spill seasons to improve juvenile survival and reduce adult passage delay.*

**Response** NMFS agrees that spillway and sluiceway passage are the preferred mechanisms (highest dam passage survival) for bypassing nontransported downstream migrants at FCRPS dams under most situations. NMFS has aggressively pursued increasing spill rates through previous biological opinions. Voluntary spills are prescribed at rates to avoid exceeding total dissolved gas (TDG) levels known to be harmful to fish. To allow for increased spill within gas caps, NMFS' 1995 FCRPS Biological Opinion required installation of gas abatement facilities. Many of these have been completed and spill levels have been increased accordingly. This biological opinion calls for additional facilities to be installed. The opinion also calls for a continuation of 24-hour spill at projects where that is already occurring and for spill to be increased from 12 to 24 hours at one additional project. The opinion does not call for 24-hour spill at all projects, however, because of concerns about the integrity of the power transmission system and because of concerns about adult fish falling back over the spillways. The opinion requires the operating agencies to address those transmission system constraints and conduct studies to provide further information on spill efficiency and effectiveness. We anticipate that spill rates and daily and seasonal duration will change throughout the life of this biological opinion in response to new information and improvements in transmission system robustness.

NMFS has determined, based on recent studies, that using spill to attract adult migrants to fishway entrances increases juvenile salmon mortality. Single-bay spill attraction was studied at John Day and The Dalles dams. Spilling small amounts near fishway entrances did somewhat increase adult attraction; however, juvenile migrants were strongly attracted to the spillway, passed downstream near the shoreline and were easy prey for predators inhabiting shoreline areas. We have concluded that near-shore spill to attract adults to fishway entrances creates hazards for juvenile migrants that exceed the benefits to adult survival and have therefore not included such measures in the RPA and have abandoned further consideration of this approach in the current fish passage plan.

**Comment** *NMFS should require the Action Agencies to reduce or eliminate power peaking.*

**Response** NMFS has concluded that current FCRPS power peaking alone does not have a significant adverse effect on migrating salmon (see Section 6.2.5.2.1). Where power peaking can affect spawning adults, incubating eggs, and rearing fry (e.g., the Hanford Reach, below Bonneville Dam) measures are in place to minimize such effects (see Section 9.6.1.2.1).

***Water Resource Management***

**Comment** *Efforts to improve reservoir management to improve downstream flow conditions can have ancillary effects on reservoir resources (e.g., resident fish, recreation, cultural resources), other stream-dependent resources (e.g., white sturgeon, bull trout, recreation, navigation), and listed salmonids that benefit from existing operations. Such issues range from concerns that further drafting of Lake Roosevelt may expose cultural sites at times of the year when they are more likely to be disturbed, to conflicts among streamflow objectives for different management species (e.g. lower Columbia River chum, white sturgeon, bull trout), and to subtle issues regarding the increased risks of meeting reservoir elevation targets as flood control criteria are changed (e.g., VARQ at Hungry Horse and Libby).*

**Response** Water resource management among the varied and competing interests in the Columbia basin is complex. NMFS has carefully crafted RPA actions that revise reservoir management strategies to balance the needs of all interests while taking all actions necessary to avoid jeopardizing listed species. For example, NMFS has worked with the Montana Department of Fish, Wildlife, and Parks and the USFWS to manage operations at Libby Dam to maintain adequate water levels in Lake Kookanusa and to provide flows beneficial to spawning white sturgeon in the Kootenai River downstream, while providing water to augment flows in the Columbia River to benefit emigrating juvenile salmon downstream from Chief Joseph Dam. NMFS also worked with these same parties to modify operations at Hungry Horse Reservoir to provide sliding-scale minimum flows downstream for bull trout and to maintain the draft limits established in the 1995 FCRPS Biological Opinion, while allowing storage releases to benefit listed salmon.

In some cases, the RPA specifies reservoir operations that benefit some listed salmon at the apparent expense of others. In making those decisions we considered the status of the listed species involved, the significance of the effects, and the number of ESUs affected. For example, the RPA requires the Corps to adopt the VARQ flood control strategy at Libby and Hungry Horse reservoirs. VARQ will cause less water to be drafted during the winter from these reservoirs in moderate runoff years, reducing winter streamflows throughout the portion of the Columbia River occupied by listed fish. This will provide a greater certainty of reservoir refill the following spring and higher discharges in the spring and summer, thus benefitting emigrating juvenile salmon. However, some have expressed concern that this would also result in lower flows during lower Columbia River chum salmon spawning (late fall), potentially adversely affecting that ESU. NMFS reasons that these effects on chum would be infrequent and minor,<sup>2</sup> would only affect one subpopulation of the lower Columbia River chum ESU and could be mitigated by careful water management at the onset of spawning to avoid unnecessary risks to

---

<sup>2</sup> Flow reductions associated with VARQ would be small (a few thousand cfs when total Columbia River flows typically exceed 150 kcfs), would most often occur after chum spawning has been completed, and would occur only during years when predicted runoff is moderate. Low and high runoff years would be unaffected.

## RESPONSE TO COMMENTS

December 21, 2000

established redds. Subsequent discharge increases in the spring and summer would benefit juvenile emigrants of eight Columbia basin ESUs. This issue, and others like it, is an indication of the need to continue to seek ways to improve runoff and streamflow forecasting to best manage Columbia basin water resources.

NMFS accepts that as new information becomes available it may become necessary to revise reservoir management plans. We anticipate such changes being developed and approved by NMFS in the 1- and 5-year management planning process.

**Comment** *The biological opinion does not designate meeting flow needs of listed salmon and steelhead as at least an equal priority with other uses of the water (e.g., power generation). It does not aggressively seek, nor does it describe, steps to acquire additional volumes of water necessary to meet flow targets.*

**Response** The RPA does have at least an equal priority with power generation, except during power emergencies. For example, the prescription to be at the April 10 flood control requirement constrains winter reservoir drafts for power, allowing the reservoirs to be higher in the spring and resulting in higher refill probabilities and higher spring flows. The RPA prescribes an additional 2-foot draft at Grand Coulee in below average water years. It also calls on the Action Agencies to take steps to acquire additional water for fish (e.g., reduce summer water storage in Banks Lake, and seek additional Canadian water and non-treaty storage in the summer).

### ***Flow Augmentation***

**Comment** *Flow augmentation from the upper Snake River basin projects provides little or no survival value to emigrating Snake River fall chinook.*

**Response** This issue was raised by several commenters. The premise of these concerns is that other environmental variables (e.g., water temperatures) are better indicators of survival or that confounding factors of experimental design (e.g., release dates and ‘readiness to emigrate’) render meaningless any conclusions on the effects of flow augmentation.

With regard to the arguments suggesting that water temperature is a better indicator of survival than is flow (Anderson et al. 2000), NMFS disagrees because currently available data are strongly autocorrelated (high flows typically are associated with cooler temperatures and higher turbidities and lower flows with warmer temperatures and lower turbidities), making identification of the relative importance of each causal agent (flow, temperature, or turbidity) statistically impossible. NMFS agrees, however, that Snake River water temperature conditions adversely affect salmon survival and has prescribed drafting cool water from Dworshak Reservoir during the juvenile fall chinook migration to both increase flows and decrease water temperatures in Lower Granite Reservoir. NMFS is also seeking to overcome the phase shift in

## RESPONSE TO COMMENTS

December 21, 2000

Snake River water temperatures caused by operations at the upstream Hells Canyon Complex in a separate consultation with the Federal Energy Regulatory Commission.

With regard to the argument that the confounding factors of experimental design render meaningless any conclusions that flow augmentation is beneficial (Dreher 2000), we agree that current data are insufficient to delineate effects of individual attributes of flow, owing to correlations among independent variables. We further agree that the ability to delineate effects would help in the assessment of flow augmentation as a management tool. Lacking such data, however, there is nothing in the current data that indicates that subyearling fall chinook salmon are harmed by flow augmentation, and plenty to suspect that they are helped.

NMFS has previously responded to these and similar concerns and concedes that universal agreement on the effectiveness of streamflow augmentation as a salmon recovery tool is not likely to occur until and unless more rigorous scientific analyses are conducted over a wider range of environmental conditions, including those that would likely result in poor survival. Although we are interested in furthering our understanding of the effectiveness of our management actions and have prescribed additional flow/survival studies, we must be cautious to avoid experiments that could result in a large take of listed fish. Thus, we expect that there will continue to be uncertainty and disagreement regarding the relative importance of streamflow in juvenile salmon survival throughout the life of this biological opinion.

**Comment** *If the objective of the flow augmentation program is to deliver sufficient water to the Snake River to overcome the travel time effects of the four lower Snake River Dams, flows well in excess of the average annual yield of the river would be required.*

**Response** We agree. The amounts of water potentially available to augment Snake River flows are finite, variable, and insufficient to overcome the travel time effects of the lower Snake River dams. Rather than managing available water resources in an attempt to fully overcome the travel time effects of the dams, NMFS works within the Regional Forum to manage available water resources to maximize salmon survival while considering the needs of a wide array of resources throughout the basin. We accept that it will seldom be possible to deliver enough water to meet the flow objectives each week through the migration season.

**Comment** *NMFS should adopt biologically-based flow objectives for Lower Granite dam (50-100 kcfs) as the Snake River flow target on a sliding scale which recognizes that it will not be achievable under current operations and normal runoff, but will serve as a goal to improve survival under higher runoff conditions (as occurred in 1997) and provide the basis for pursuing additional flow augmentation in future years.*

**Response** Current in-season management is aimed at providing the best possible survival conditions given existing and anticipated streamflow and water temperature conditions. The RPA directs the Action Agencies to operate the FCRPS reservoirs to increase streamflows for

this purpose and to seek other measures that could further increase streamflows at critical times (e.g., additional water from Canada, changes in flood control operations, and acquiring water from willing sellers).

We agree that increasing summer streamflows (within limits) during juvenile salmon emigrations can improve survival. However, setting higher summer flow objectives at Lower Granite Dam, though arguably biologically justified, would unnecessarily further complicate in-season management. With currently available water resources, it is seldom possible to meet the existing Lower Granite flow objective during late August, and water temperatures often approach lethal levels. If a higher summer flow objective were established, then the Technical Management Team (TMT) would be frequently faced with the dilemma of allowing a longer period of deficit flows or, by delivering more water early in the season to enhance conditions for early migrants, creating more severe flow deficits in late summer with higher water temperatures. Moreover, when runoff is abundant, the TMT could choose to exceed the current flow objectives using available scientific information as a guide to allocate available water to benefit summer migrants.

### ***Emergency Management***

**Comment** *NMFS should require BPA to include “interruptibility” clauses in appropriate new power sales contracts to allow flexibility in dealing with power emergencies without reducing or eliminating fish protection measures.*

**Response** NMFS is concerned that management of power emergencies not unnecessarily interrupt fish protection measures and that regional power managers take all appropriate actions to reduce the probability of such emergencies. Reducing fish protection measures to meet power needs should be viewed by the Action Agencies as a last resort and should not be used in place of the long-term investments necessary to ensure power system reliability. To ensure that the adverse effects of power emergencies are minimized and to facilitate the development of emergency actions, TMT has developed “Protocols for Emergency Operations in Response to Generation or Transmission Emergencies” (September 22, 2000). The RPA requires that the 1- and 5-year water management plans (Section 9.4.2.2) address exceptions for power emergencies. NMFS expects those plans to direct the Action Agencies to coordinate any reductions or suspensions of fish protection measures during emergencies through the TMT. Emergencies with effects of exceptional magnitude or duration, will be discussed with regional executives, including the affected States and Tribes.

### **Basinwide Recovery Strategy and Offsite Mitigation**

This biological opinion relies on offsite mitigation measures described in the Basinwide Recovery Strategy (Federal Caucus 2000) in defining a reasonable and prudent alternative. This approach is necessary because given current scientific understanding, it is not possible to meet the survival and recovery indicator criteria for listed salmon and steelhead (see Section 6.1.2)

through survival improvements at the FCRPS alone (see Sections 6.3 and 9.7.3). In applying the Basinwide Recovery Strategy, NMFS analyzed current population trends and identified the survival improvements necessary to meet specified survival and recovery indicator criteria (McClure et al. 2000, Cooney 2000). The Basinwide Recovery Strategy developed a comprehensive set of actions designed to achieve the indicator criteria using subbasin planning, Federal funding, and Action Agency assistance.

***Exceeds Federal Agency Authority***

**Comment** *The Basinwide Recovery Strategy encourages the Action Agencies to intrude into areas traditionally within the authority or jurisdiction of the state and local governments.*

**Response** NMFS encourages the broadest possible involvement of regional entities, governmental and non-governmental, in the recovery of listed fish. We use the Basinwide Recovery Strategy to understand how ongoing and planned offsite actions will affect each ESU and to identify opportunities for the Action Agencies to enhance such actions. To fulfill their obligations under the RPA, the Action Agencies will have to identify and implement sufficient offsite measures to meet the survival and recovery indicator criteria.

***Federal Commitment to Implement the RPA***

**Comment** *The biological opinion describes an RPA for operation of the Federal hydropower system that does not significantly change the status quo.*

**Response** Most of the improvements in salmon survival available through modifications of FCRPS operations and fish protection facilities have already occurred pursuant to previous biological opinions. However, this RPA does prescribe additional changes in FCRPS operation and configuration to enhance fish survival and requires additional studies to judge the merits of other measures. Further, by requiring offsite mitigation and establishing clear performance standards, a series of mid-term evaluations, and a decision tree that could lead to further actions, it alters the paradigm for avoiding jeopardy – participation in the Basinwide Recovery Strategy.

**Comment** *The biological opinion does not acknowledge that many measures in the 1995 biological opinion were not implemented as intended, or at all, for various anticipated and unanticipated reasons. As a result, the biological opinion does not assess the likelihood that individual measures in the proposed RPA will be fully implemented.*

**Response** Most measures prescribed in the 1995 opinion's RPA have been implemented effectively. Those 1995 biological opinion RPA actions where the Action Agencies have been unable to deliver the desired outcomes were primarily associated with efforts outside of their direct control and authority (e.g., acquisition of additional water in Canada). Though it is not certain that Congress will grant the Action Agencies' budget requests to implement all of the

## RESPONSE TO COMMENTS

December 21, 2000

measures prescribed in this RPA, the Action Agencies have committed to pursuing all the measures prescribed in this RPA. Through the development of annual and 5-year plans, the Action Agencies will be able to focus on accomplishing the measures prescribed in this RPA. Through the mid-term progress reviews (see Section 9.5) the Federal parties, including NMFS, will be able to measure the effectiveness of those efforts and respond accordingly. Failure to implement measures prescribed in this RPA, for any reason, could result in NMFS issuing a failure report, requiring implementation of additional measures or reinitiation of consultation.

**Comment** *The reasonable and prudent alternative has no budget or implementation detail.*

**Response** The Federal parties are currently developing detailed budget and implementation information and expect to release this information shortly after the biological opinion is signed.

### ***RPA Insufficiently Defined to Afford Analysis or Support Conclusion that it Avoids Jeopardy***

**Comment** *If the draft biological opinion were based on an appropriately structured decision as recommended by the National Research Council, the analyses would be focused on the performance of some clearly defined alternatives.*

**Response** The RPA does not define all of the actions necessary to achieve the extinction risk and recovery probability goals (indicator criteria). This lack of specificity is due, in part, to the need for cooperation and initiative by non-Federal parties in defining what can and should be done. NMFS accepts that there are unquantified uncertainties associated with the RPA's avoidance of jeopardy. However, we have approached this uncertainty by using an adaptive management approach of: setting goals (indicator criteria); taking actions and gathering new scientific information; and measuring outcomes to assess the effectiveness of the actions taken, and to define new actions as necessary. (See Section 9.5)

The perceived benefit of defining all possible actions and choosing an alternative based on the predicted outcomes of various aggregations of actions is illusory. Simply put, current science is unable to precisely predict the salmon population response to individual actions aimed at improving survival in one or more life stages. Predicting population responses to an array of actions throughout the salmon's life-cycle thus depends on an array of assumptions about the effectiveness of individual actions. This can result in a wide range of estimated outcomes. Also, as can be seen in the biological opinion's Table 9.2-17, the range of additional improvements in survival from offsite mitigation actions needed to achieve the survival and recovery indicator criteria is quite large. Combining the uncertainty regarding the need for additional survival improvement with the uncertainty regarding the effect of individual actions and their likelihood for being implemented, suggests that selecting an alternative with a fixed set of offsite mitigation actions needed to meet the survival recovery indicator criteria would be unlikely to identify the most effective approach.

### Habitat Measures

#### *Water Brokerage Concept*

**Comment** *Idaho objects to the proposed experiment with innovative ways to increase tributary flows through a water brokerage demonstration project, arguing that NMFS should not direct Federal agencies to usurp state water authority, but should respect state mechanisms that balance fish and consumptive water needs. Other state agencies in the region have expressed a desire to be involved in developing the water brokerage concept.*

**Response** The water brokerage is intended to provide incentives for water users to restore stream flows within the framework of state law. The project will provide funding to demonstrate innovative ways to provide instream flows, not to assert Federal authority over water. State water agencies will play an important role in this program and will be asked to be part of implementation discussions.

#### *Mainstem Habitat*

**Comment** *The opinion's mainstem habitat action item puts too much emphasis on study and planning; we already know how important the mainstem habitat is for the survival of the salmonid stocks.*

**Response** Mainstem habitat is important to the survival of anadromous salmonids. However, we cannot currently adequately quantify the relationships between salmonid survival and specific mainstem habitat features, and we know that some improvements can have deleterious effects on listed fish by, for example, benefiting resident species that prey on juvenile salmonids. Accordingly, the RPA calls for careful evaluation of direct habitat actions, operations and predator management. Monitoring and evaluation feedback will provide a basis for modifying or accelerating these actions in 1- and 5-year plans. We disagree that the RPA's mainstem habitat action item (action item 155) represents a continuation of the status quo. To the contrary, it is through this strategy that mainstem habitat improvements that could benefit salmon in ways other than migration survival can be identified and implemented.

#### *Subbasin Assessments and Planning*

**Comment** *The Federal program is based on assessments and planning. While there is a need for some planning, critical recovery efforts should not wait for final plans.*

**Response** Subbasin assessments and planning are a crucial foundation for the long-term habitat restoration strategy. At the same time, the Federal agencies do not intend to wait for subbasin and watershed assessments and plans where habitat problems are known and effective actions can be taken immediately. Thus, the RPA prescribes fast-start actions to address known habitat

## RESPONSE TO COMMENTS

December 21, 2000

problems – such as those associated with water diversions – whose correction will have immediate benefits. This work will begin in three priority subbasins per year, starting in 2001. Although some planning will be needed to organize this work, it will not wait for subbasin and watershed assessment and planning. Subbasin and watershed assessment and planning will identify actions beyond these fast-start actions.

**Comment** *Land management agencies have chosen seven subbasins in the Columbia Basin as high priority for anadromous fish habitat restoration, but exclude the subbasins in the Snake Mountain Province because they “are above the four Snake River Dams, with a strong likelihood that they will have insufficient adult escapement for optimum utilization of restored habitat.” This Federal perspective seems to exclude habitat efforts in Idaho for the near term because the Salmon and Clearwater Subbasins have so few fish.*

**Response** The RPA includes Idaho’s Lemhi River basin as a priority subbasin in the first year of tributary habitat improvements and, by reference, another three subbasins (upper Salmon, Middle Fork Clearwater, and Little Salmon) in the 5-year plan for tributary habitat improvements (Action Item 149). Improving anadromous fish habitat conditions on Federal lands in the headwaters of the Salmon and Clearwater basins is not a priority for Federal land managers because relatively few adult fish return to spawn on Federal lands in these basins. This paucity of returning fish is due to problems downstream, such as degraded rearing habitat, unscreened diversions, and dam passage. As these limits on downstream survival are alleviated by restoring stream flows and fixing passage obstructions and inadequately screened diversions, escapement to Federal headwater habitat is expected to increase. This is particularly so in the Salmon and Clearwater subbasins, historically among the most productive subbasins for spring and summer chinook. NMFS expects that as escapement increases, Federal habitat restoration in these subbasins will rise in priority. Pending this outcome, Federal land managers are expected to protect high-quality Federal habitats.

**Comment** *Non-Federal habitat improvements will not recover the ESUs in the Snake Mountain Province when the most limiting factor – migration corridor mortality – is not being addressed. The modeling fails to address this or provide any limiting factor analysis for any subbasin.*

**Response** We disagree with the assertion that migration corridor survival is not being addressed in the biological opinion. Migration corridor survival is a primary focus of the hydro actions prescribed in the RPA (see Section 9.6.1).

**Comment** *There are stocks in pristine (Marsh Creek) and designated wilderness areas (Sulphur Creek) that are in immediate risk of extirpation. This indicates that improving habitat quality and quantity, though desirable, is insufficient to recover spring/summer chinook.*

**Response** Clearly, the potential for improvement in spawning, incubation, and early rearing survival in wilderness streams like Marsh and Sulphur creeks is small. In the Snake River

Province, and elsewhere, the habitat strategy outlined in this opinion concentrates on problems in lower-elevation, non-Federal tributary habitats below pristine areas such as Marsh and Sulphur creeks. Fish that spawn on uplands must pass through, feed, and rear in lower reaches. Downstream redistributions of juveniles in the winter following the first summer of rearing have been detected in several studies of spring chinook in the Columbia basin. Historically, lower-elevation, alluvial reaches are thought to have been “*the fish factories of the Columbia River system*” (ISG 1996, at 509). These reaches tend to have more meanders and alluvial features, have been more heavily impacted by human activities, and, therefore, have considerable potential for improvement in productivity.

**Comment** *Performance measures need to be developed at the critical reach and watershed scales and aggregated from the bottom up. Changes in these attributes can be measured at the reach or watershed level and aggregated to larger spatial scales to evaluate progress at the subbasin or basin level. However, the draft weakens this idea by requiring that performance standards initially be expressed only as “desired trends” in the attributes, instead of specific endpoints. In Forest Service management, few forests have developed quantitative endpoints to describe the desired conditions. The direction from the FCRPS biological opinion should be to develop hard and accountable standards—not unmeasurable trends.*

**Response** The draft opinion called for the development of performance measures and monitoring and evaluation mechanisms that could measure change in habitat attributes at the reach and watershed scales and aggregate it to evaluate progress. While the final opinion has been changed to clarify how this will be done, it is not possible to define quantitative, reach-by-reach and watershed-by-watershed endpoints without better information than currently exists. Subbasin and watershed assessments and other research and analysis should help supply this information. While this information is gathered, we describe performance measures as desired trends.

**Comment** *The opinion does not account for the fact that benefits from habitat actions accrue slowly.*

**Response** The opinion considers the slow results of habitat actions by putting immediate priority on measures whose benefits can accrue more rapidly — measures to reduce the impacts of water diversions in high-priority subbasins through stream flow restoration, diversion screening and removal of passage obstacles. While these programs are underway, broader habitat actions with benefits that accrue more slowly will be identified in subbasin and watershed assessments and implemented consistent with subbasin and watershed plans.

We tested the sensitivity of the quantitative estimates of needed survival change to delayed implementation of anticipated survival improvement measures (see Section 6.3.3.5). These results indicate that the needed survival change estimates are sensitive to the time needed to implement the actions and achieve the anticipated benefits. The implications are obvious.

## RESPONSE TO COMMENTS

December 21, 2000

Aggressive, effective, timely implementation of all RPA actions and other anticipated actions to benefit salmon survival is needed if the performance standards are to be achieved.

### *Regional Coordination and Cooperation*

**Comment** *Clarify whether habitat protection efforts, including those in the estuary, will be limited to willing transactions.*

**Response** The RPA action items regarding agricultural riparian buffers, the BPA habitat protection fund, and the estuary habitat protection and enhancement program are designed to rely on willing transactions.

**Comment** *The incidental take statement provides ESA coverage only for Action Agencies. It should also extend coverage to individual water users and landowners who participate in programs identified in the biological opinion.*

**Response** This opinion and the incidental take permit cover only the actions proposed by the Action Agencies as part of this consultation. By participating in the programs outlined in this opinion, however, water users and landowners can minimize potential liability by minimizing take of listed species. Individual water users and landowners may also secure incidental take coverage under ESA Section 10.

**Comment** *The draft identifies BOR as the lead agency for flow, passage, and screening problems in the basin. However, the BOR lacks authority to fund much of this work. The draft offers a speculative proposal that BPA will bridge the gap by providing funding if Congress provides authorization.*

**Response** The BOR has authority to facilitate the priority subbasin work, to fund and acquire water for flows, and to supply technical assistance for screening and passage work. The Secretary of Interior, the head of the agency of which the BOR is a part, has authority to fund screening and passage work. To complement Interior and BOR funding, BPA funds may be used through the CBFWA/NWPPC process.

**Comment** *The agencies propose to make clearances under ESA and the Clean Water Act more efficient for landowners through programmatic consultations and other unidentified mechanisms. These devices will only make it easier for the landowners to escape their responsibilities under ESA and CWA.*

**Response** The purpose of regulatory streamlining is to identify categories of actions that satisfy regulatory concerns, cover them programmatically, and allow regulatory processes to devote their resources to unique or more significant conservation issues. This approach does not make it easier for landowners to escape statutory requirements, but does makes it easier for them to

## RESPONSE TO COMMENTS

December 21, 2000

comply with statutory requirements with minimum regulatory involvement. It also helps ensure that government resources are used in proportion to the importance of the conservation issue.

**Comment** *There is no need for a Federal Habitat Coordination Team; instead, designate an existing entity to coordinate and establish a strong accountability mechanism for senior staff and decision-makers of agencies involved in management of fish resources.*

**Response** The biological opinion and Basinwide Recovery Strategy stress the need for coordination through a Federal Habitat Coordination Team because no existing entity performs these vital coordination functions. Accountability will be ensured through performance standards, monitoring, and evaluation.

**Comment** *We also note the absence of the EPA and the two land management agencies, the BLM and USFS, in the discussion of offsite mitigation measures. These agencies need to be active participants in this process. Also, we note that offsite measures have not been specifically identified at this point, as is implied in this section.*

**Response** Wherever actions undertaken by Federal agencies may affect listed anadromous fish species, they are obligated to consult with NMFS. Through such consultation, NMFS intends to ensure that such actions conform with the Basinwide Recovery Strategy approach to recovery and established subbasin plans.

### Harvest

#### *Harvest Levels Relative to Contributions in Habitat, Hydro, and Hatcheries*

**Comment** *Ocean and other mixed stock fisheries (e.g., those in the mainstem) should be further reduced. Any harvest of listed fish is a flawed policy.*

**Response** Like any activity affecting listed fish, harvest must meet the requirements of the ESA. Accordingly, NMFS has issued biological opinions on all recent harvest plans to ensure that harvest does not jeopardize listed fish. NMFS disagrees with the notion that *any* level of harvest impact on listed fish is unwarranted. If all sectors were held to such a standard, almost all human activities that affect listed fish would have to be halted. Stated another way, NMFS does not apply the ESA in such a way that any one sector must be totally eliminated, whether it be harvest or habitat development, as a precondition of applying restrictions on other sectors. NMFS attempts to allocate the conservation burden equitably and to emphasize those sources of harm that are the leading cause of decline and have the greatest potential for long-term recovery.

**Comment** *The potential benefits of additional harvest cuts are understated.*

**Response** In crafting the final biological opinion we relied on estimated survival benefits of

## RESPONSE TO COMMENTS

December 21, 2000

additional harvest cuts conducted by McClure et al. (2000). In light of the harvest constraints put in place in recent years, relatively little additional benefit would accrue for most ESUs from additional harvest cuts, although a few of the ESUs would benefit. Even for those ESUs, additional harvest cuts will not remedy the fundamental problems that are rooted in productivity as affected by other sources of mortality.

**Comment** *Harvest has already been reformed and has already paid more than its fair share of the allocation burden.*

**Response** NMFS acknowledges the substantial harvest reforms implemented by the fishery managers over the last several years. Because of these reforms, particularly those implemented in the last few years, NMFS generally does not call for additional harvest cuts, but rather calls for existing constraints to continue until recovery efforts to succeed.

**Comment** *Harvest reductions (including tribal harvest cuts) have been proven ineffective at recovering listed fish.*

**Response** Many listed ESUs are in their present condition because of the chronic decline in productivity of natural populations caused by a various factors. Harvest managers have been responding to this trend by reducing harvest, in some cases for decades. The CRI analysis (McClure et al. 2000) shows that these reductions may well have prevented extinction for many populations in the Columbia basin. However, when the productivity is so low that spawners cannot replace themselves even in the absence of harvest, then further harvest reduction is clearly not the answer. Nevertheless, it would be easy to thwart recovery efforts by allowing increases in harvest of listed fish. While acknowledging that legitimate arguments that can be made regarding whether the conservation burden placed on harvest is fair, NMFS is aware of no arguments that suggests increasing harvest at this time is consistent with recovery.

### ***Harvest Allocation Policy***

**Comment** *Harvest allocation should be decided in the US v OR forum. The Federal government's policy favoring Tribal fisheries (as described in the Basinwide Recovery Strategy and referred to in the biological opinion) is inconsistent with case law. Harvest allocations should be addressed in a new CRFMP.*

**Response** NMFS prefers that harvest allocation be worked out between the tribes and states in the *US v OR* process and commits to do whatever it can to encourage such agreement. However, when the state and Tribal parties are unable to reach agreement, the Federal government's position is as stated in the Basinwide Recovery Strategy: established case law gives priority right to Tribal fisheries over non-Tribal fisheries. NMFS and the other Federal agencies also would greatly prefer that a longer-term management agreement addressing the allocation issue (and other relevant issues) be negotiated by the parties and embodied in a new, multi-year

## RESPONSE TO COMMENTS

December 21, 2000

CRFMP that meets the requirements of the ESA and the other objectives of the parties. Such a plan would replace the current pattern of six-months-at-a-time fishery proposals and biological opinions.

### *Selective Fisheries Policy*

**Comment** *Selective fishery emphasis is applauded and should be pursued aggressively with Federal leadership. Selective fisheries policies should be included in a new CRFMP.*

**Response** NMFS intends to continue working with Tribal and state comanagers to develop and expand selective fishery opportunities and has, through the biological opinion, enlisted the assistance of the Action Agencies in this effort. NMFS agrees that harvest agreements, whether or not they involve selective fisheries, should be embodied in a new CRFMP.

**Comment** *Selective fishing involves more than just selection for hatchery fish.*

**Response** We agree. Some natural stocks produce harvestable fish that may be accessed using selective fishing techniques; this point is reflected in the final biological opinion.

**Comment** *Selective fishing is a fishery enhancement tool, not a recovery tool. Selective fisheries have been proven ineffective as a recovery tool; at best they're only a fishery enhancement measure and help justify hatchery budgets.*

**Response** NMFS agrees that the primary purpose of selective fishing is to allow fisheries, not to recover listed populations. However, selective fishing provides the potential to harmonize the conservation mandate of the ESA with other mandates to maintain fisheries. Clearly, producing fish in hatcheries – at great cost to the region – makes little sense if few of those fish can be caught in fisheries. In many cases, a promising chance of making these hatchery fish (and certain healthy natural stocks) available for fisheries in the context of listed fish lies in greater fishery selectivity, particularly live-catch selective fisheries. NMFS does not believe that selective fishing should be promoted as a recovery measure, as some have done in the past. Rather, selective fishing should be recognized and valued for what it is: a potential means to allow valuable fisheries to proceed without undermining recovery efforts that focus on addressing the factors of decline which led to the listings.

**Comment** *Selective fishing will lead to bad hatchery policies.*

**Response** This comment stems partly from the way selective fisheries and hatchery policies were used in the past, particularly in the context of steelhead fisheries. For many years, steelhead hatcheries tended to rear and release out-of-basin stocks, manipulate the timing of the stocks to accommodate fisheries and/or minimize interactions between returning hatchery fish and endemic populations, and produce only one or two stocks over a large region. The risks that

## RESPONSE TO COMMENTS

December 21, 2000

these hatchery practices pose to natural populations are now much better understood. Eliminating harmful hatchery practices comprises a major focus of hatchery reforms, as addressed below. Many of these past practices simply will not be allowed today under the ESA because of the threat they pose to listed populations.

Another concern reflected in this comment is that using hatcheries to produce fish for fisheries will tend to distract from their use as recovery tools. Again, the essence of this argument lies in the continuing, unresolved debate that exists regarding the appropriate role of hatchery supplementation as a recovery tool (see above). NMFS believes that hatcheries can and must be used for both purposes – conservation and fishery mitigation. Achieving the mitigation purpose of hatcheries need not come at the expense of whatever role they should play in recovery.

**Comment** *Ramifications of selective fisheries to Tribal cultures must be considered.*

**Response** NMFS acknowledges this point, and has included it in the final biological opinion. There is no question that selective fisheries can involve various changes in the manner and/or location of fisheries. The key point here is that the Tribes must be included in the effort to develop and/or expand selective fishing opportunities so that they can ensure that cultural issues are appropriately addressed.

### ***Selective Fisheries – Technical Matters***

**Comment** *Selective fisheries will undermine the coastwide coded wire tag (CWT) program.*

**Response** The CWT program is critical to monitoring stock status, evaluating stock- and fishery-specific exploitation rates coastwide, and managing many fisheries. Maintaining the viability of the program is required under the Pacific Salmon Treaty. Selective fishing can undermine the viability of the program absent certain modifications. The Pacific Salmon Commission's Selective Fishery Evaluation Committee has made considerable progress toward addressing many of the analytical problems posed by selective fisheries. For example, it is now considered technically feasible to maintain the viability of the CWT program when selective chinook fisheries are conducted in terminal areas. Not all the problems have been solved yet (e.g., incidental mortalities; see below), however, and the solutions will involve significant and costly changes in the way fishery information is collected and analyzed. This is explicitly recognized and described in the final BO, which calls for a substantial effort to address the remaining technical issues. Again, the Action Agencies will be expected to contribute to this effort.

**Comment** *Incidental mortalities associated with selective fisheries (especially multiple captures) must be determined.*

**Response** NMFS agrees. Existing estimates of catch-and-release mortalities associated with

## RESPONSE TO COMMENTS

December 21, 2000

selective fisheries must be improved and refined for a variety of specific applications. Accordingly, the RPA obligates the Action Agencies to contribute to studies to improve estimates of incidental mortalities as necessary to determine whether selective fishery regimes can be implemented consistent with the needs of listed fish.

**Comment** *Selective fisheries will require revamping of existing management systems and tools.*

**Response** NMFS agrees. The RPA requires the Action Agencies to contribute to these costs.

### ***Fishery License Buy-out***

**Comment** *Any buy-out of fishery licenses must be voluntary.*

**Response** NMFS agrees, and this point is made in the final biological opinion. It should be noted that, in this context, the buy-out of licenses is voluntary in the sense that the biological opinion cannot and does not purport to compel commercial fishermen to sell their licenses; nor does the biological opinion assume that buy-outs will occur. The states may, however, have authorities under state laws to reduce the number of licenses they issue; the biological opinion does nothing to affect those authorities.

## **Hatcheries**

### ***Hatchery Production Plans***

**Comment** *All hatchery production should be marked.*

**Response** In general, NMFS agrees and has directed the Action Agencies to facilitate the development of a comprehensive marking plan for each salmon and steelhead species in the Columbia basin (see Section 9.6.4.2). The ability to distinguish between hatchery fish and natural fish on the spawning grounds is critical to ascertaining the status of natural populations. Additionally, marking may enable selective fisheries when such fisheries are appropriate. Only under certain and unusual circumstances should hatchery fish not be marked. NMFS' call for marking of hatchery fish does not imply use of a particular mark. Some hatchery fish – those produced for conservation purposes, for example – should be protected from harvest, rather than made more vulnerable to it by a mark used to effectuate mark-selective fishing.

**Comment** *New production details should be developed in US v OR and incorporated in a new Columbia River Fishery Management Plan (CRFMP).*

**Response** NMFS supports development of a new CRFMP and recognizes that production will be an important component of it, as it was in the previous plan. However, the FCRPS biological opinion cannot be used to compel the *US v OR* parties to reach any particular conclusion in that

settlement process. In addition, NMFS believes that production activities must stand on their own merits, e.g., be consistent with ESA. Production that is inconsistent with ESA cannot be made a condition of appropriate harvest regimes, and vice-versa.

***Hatchery Reform***

**Comment** *Hatchery reforms are not sufficiently defined.*

**Response** In the draft biological opinion, there were many references to “hatchery reform” as that term has been defined in other documents and processes, e.g., the NWPPC’s Artificial Production Review. In the final biological opinion, NMFS provides additional information as to what constitutes hatchery reform. However, because the identification and application of reforms needed at existing projects involves a program-by-program, hatchery-by-hatchery process of review, it is not feasible to identify every particular reform for every particular hatchery program in the FCRPS biological opinion. Instead, NMFS calls for the process of identifying needed reforms using the vehicle of hatchery and genetic management plans (HGMPs). NMFS has taken steps to ensure that the necessary resources will be available by identifying HGMPs in the RPA and calling for their completion across the basin according to an ambitious schedule.

**Comment** *Reform benefits are not quantified.*

**Response** NMFS has attempted to qualitatively assess the benefits of hatchery reforms, but currently has no way to quantify the benefits of specific hatchery reforms. Instead, hatcheries will have to do a much better job of identifying their goals and objectives and monitoring and evaluating their results – measures that have been called for in a number of artificial production reviews. Additionally, a number of specific scientific studies are proposed to address the issue of quantifying artificial-production-related effects. Over time, these investments in monitoring and evaluation and scientific studies should provide improved capability to quantify hatchery effects.

**Comment** *Reform benefits are wrongly attributed to monitoring and evaluation.*

**Response** Progress on implementing hatchery reforms will be among many measures that are monitored to ensure that the Action Agencies are fully implementing the biological opinion. However, as noted above, no specific, quantified credit can be attributed to any particular hatchery reform at this time, pending the results of further studies and M&E. The effectiveness of hatchery reforms will be evaluated in our 5- and 8-year reviews.

**Comment** *Cost of reforms is not provided and/or is underestimated.*

**Response** NMFS has made only very rough estimates of the costs of hatchery reforms; detailed estimates of costs necessarily must await completion of the HGMP planning process referenced

above. Given that many reforms will involve modifications (capital improvements) at many facilities, it is certain that the costs will be substantial. Examples of capital investments include building new brood stock collection facilities and/or new rearing and acclimation facilities to accommodate the production of multiple populations at a given facility. The RPA specifically obligates the Action Agencies to provide a substantial portion of the necessary resources, to speed up the pace of these reforms, and to ensure they are applied as broadly as practical to increase the margin of safety afforded to listed fish. Nevertheless, because the Action Agencies are not entirely responsible for all artificial production facilities, they cannot be expected to provide *all* of the needed resources. Recognizing this need, both NMFS and USFWS, for example, are preparing budget submissions for consideration by Congress to fund reforms at federally funded facilities.

**Comment** *US v OR parties have no direct link to Northwest Power Planning Council (NWPPC) funding.*

**Response** NMFS cannot expand the scope of *US v OR* through the FCRPS biological opinion, nor can it obligate the NWPPC to fund projects agreed upon in *US v OR* outside of its established funding processes. However, each of the *US v OR* parties is an active participant in the NWPPC's regional funding processes. As a practical matter, NMFS fully expects that, to the extent the *US v OR* parties can agree on necessary artificial production measures that are consistent with the ESA and other objectives, these agreements will be afforded substantial consideration in regional funding processes. Because BPA retains its funding authority and is ultimately responsible for compliance with the biological opinion, funding will be provided through the RPA for projects that are determined to be essential for ESA purposes.

**Comment** *Mechanisms for implementing reforms are unclear.*

**Response** As noted more clearly in the RPA in the final biological opinion, each entity operating an artificial production program or facility is responsible for meeting the requirements of the ESA. Accordingly, each is responsible for providing the mechanism for implementing reforms after the specific reforms are identified pursuant to the HGMP process described above. The Action Agencies, as the source of funding for many of the facilities, Congress, or the state legislatures (for state-owned and operated facilities) will have to provide the necessary funding in order to meet ESA requirements at their respective facilities. As noted above, the FCRPS Action Agencies have been given a special incentive, in the form of the offsite mitigation concept, to provide an additional increment of funding to speed the pace of these reforms and increase the margin of safety above the level that otherwise could be required of an owner or operator of a facility to comply with ESA.

### ***The Mitigation Mandate of Hatcheries***

**Comment** *The mitigation mandate of hatcheries must not be abandoned.*

**Response** NMFS agrees; the final biological opinion more clearly addresses this issue. In short, it specifically acknowledges that many hatchery programs in the basin were authorized and operate under a legal mandate to mitigate for various forms of development, particularly including development and operation of the FCRPS. Fulfilling this mitigation mandate is required by law and is essential for fisheries purposes, including the obligation to provide fishing opportunities for Tribal fisheries. Although both the biological opinion and the Basinwide Recovery Strategy strive to harmonize these ESA and mitigation mandates, fishery objectives must sometimes yield to conservation requirements, in the near-term.

### ***Hatchery Supplementation as a Recovery Tool***

**Comment** *No amount of hatchery supplementation, regardless of fish ancestry, can substitute for restoring productivity of the habitat.*

**Response** NMFS agrees; this point is emphasized in the final biological opinion. However, as noted below, various forms of artificial production can be used as a temporary hedge against extinction risk to give other recovery measures sufficient time to take effect.<sup>3</sup> In addition, hatcheries can provide an important mitigation benefit for fisheries and, when used appropriately, may provide a valuable tool to aid recovery.

**Comment** *NMFS has an excessive bias against hatcheries, based on unproven negative effects of hatcheries. NMFS's stray rate standards are arbitrary.*

**Response** NMFS bases its hatchery policies on the best scientific information available, gleaned from many sources including but not limited to the published scientific literature relating to salmon biology and the general area of conservation biology. Nevertheless, we acknowledge that reasonable scientists can disagree on the proper interpretation and application of available scientific information. The final biological opinion identifies the potential effects of gene flow from hatchery fish or other non-endemic fish to natural populations as a critical uncertainty and the RPA prescribes specific studies to address this uncertainty. As is required by ESA, NMFS has used the best available scientific information and its scientific judgement to prescribe actions that minimize this potential adverse effect of hatchery fish. Even given this constraint, a great deal of hatchery production occurs today throughout much of the Columbia basin.

**Comment** *NMFS' treatment of hatchery spawner effectiveness is confusing.*

**Response** We agree. The final biological opinion has been rewritten to make the issues clearer.

---

<sup>3</sup> While hatcheries can serve as backstops to prevent absolute extinction, hatchery progeny are not considered when determining if an ESA-listed population is recovered, and NMFS' life-cycle analysis takes measures to discount hatchery progeny.

## RESPONSE TO COMMENTS

December 21, 2000

**Comment** *Supplementation should be expanded, not restricted.*

**Response** NMFS supports the use of hatchery supplementation in a variety of forms in many parts of the basin. This support is evident in biological opinions issued on hatchery programs and in the measures called for in the FCRPS biological opinion. Nevertheless, despite a significant amount of agreement on many issues relating to supplementation, a wide range of divergent views remain on the appropriate use of supplementation as a recovery tool. Whether supplementation currently is being used too much or too little remains unresolved. Credible scientific evidence available to resolve this issue is lacking. What NMFS has tried to accomplish in the biological opinion – and what the Action Agencies will be contributing to – is an increased, focused effort to resolve the pertinent scientific questions to better inform the benefit/risk equation. In the meantime, NMFS advocates that a variety of approaches be used in an adaptive management framework to help determine, over time, the most appropriate use of supplementation as a recovery tool.

**Comment** *Hatcheries should produce fish that are suitable for spawning in the wild.*

**Response** We agree. For this reason NMFS considers the phasing out of inappropriate brood stocks and their replacement with locally-adapted brood stocks a key element of hatchery reform. A particular challenge for hatchery programs involves protecting the genetic diversity of natural populations, a difficult undertaking for any hatchery program.

**Comment** *Adult returns of hatchery-planted juveniles proves their suitability, so they should be treated as equal in value to naturally produced fish.*

**Response** NMFS does not dispute the fact that hatcheries effectively produce adult returns. However, the value of supplementation to endangered species recovery depends not on the ability of out-planted hatchery fish to return to natural spawning areas, but on whether the hatchery fish successfully spawn in the wild and their progeny actually return.

**Comment** *A variety of supplementation strategies should be employed.*

**Response** We agree. However, reasonable people can disagree on what constitutes a “variety” and what strategies should be employed in particular circumstances. All hatchery strategies should be carefully designed and implemented to avoid or minimize potential adverse effects on listed populations.

### ***Safety-Net Projects***

**Comment** *No criteria are provided for determining the need for interventions. The initial list of safety-net projects is comprised mostly of already-started projects.*

**Response** The final biological opinion provides a more detailed description of the safety-net program (see Section 9.6.4.3). It includes a four-step process to determine whether a population should be targeted for intervention and, if intervention is warranted, how it should occur. The RPA requires BPA to allocate funds to facilitate safety-net actions whenever they are needed throughout the life of the biological opinion. Several projects on the initial list are already underway; these will benefit from increased resources provided by the Action Agencies.

### **The Dam-Breaching Alternative**

A broad array of interested parties (states, tribes, non-governmental organizations) have commented on NMFS' treatment of the concept of partially removing four lower Snake River dams (Corps 1999) in the biological opinion. These comments ranged from suggestions that further consideration of this measure was unwarranted to recommendations that NMFS prescribe immediate implementation of this measure in the RPA. In Section 9.7.3, NMFS evaluates and compares this measure to the RPA. Section 9.2 sets performance standards, including stock-status standards, by which the effectiveness of the RPA will be measured. Section 9.5 describes the mid-point evaluations designed to test the effectiveness of RPA implementation and, if necessary to achieve the performance standards, to define new actions, potentially including requesting congressional authorization for a dam-breaching alternative. Below are brief responses to selected issues raised by commenters not otherwise discussed in the biological opinion.

**Comment** *NMFS should consider the Governors' Recommendations, which do a better job of keeping the primary sources of discretionary mortality in focus and embracing a conceptual approach to attempt to address these problems prior to breaching dams.*

**Response** The measures prescribed in the RPA, broadly aimed at reducing all human-caused impacts (Basinwide Recovery Strategy) on, and critical uncertainties regarding, salmon survival, presents actions similar to the Governors' Recommendations (Kempthorne et al. 2000). Where the two plans conflict (e.g., restricting the locations of Tribal harvest) there are often either legal or institutional barriers to implementing the Governors' suggestions. In general, NMFS applauds and supports the efforts undertaken by other parties to improve salmon survival. However, in the event regional efforts to recover salmon, including the measures prescribed in the RPA, do not meet the performance standards established in this biological opinion, NMFS cannot rule out the possibility that it would prescribe actions to facilitate dam breaching in a future RPA.

**Comment** *We continue to believe that breaching the lower four Snake River dams is the only alternative that is going to restore salmon in the Snake Basin to numbers that allow the U.S. government to meet Tribal and Pacific Salmon Treaty obligations, as well as allowing for meaningful sport harvest. And we believe that restoring Snake River salmon populations must be a major component of any Columbia Basin salmon restoration plan.*

## RESPONSE TO COMMENTS

December 21, 2000

**Response** There are several reasons why NMFS and the Action Agencies have deferred the “dam breaching decision” in this biological opinion:

- Though drawing down the four lower Snake River dams has the highest survival benefit and the highest probability of recovery for the four Snake River ESUs of any measure considered in this biological opinion,<sup>4</sup> it would primarily benefit four ESUs in the Snake River basin with little, if any, benefit to eight other ESUs in the Columbia basin, some of which are at greater risk of extinction.
- The measure would have large socio-economic impacts that may reduce the ability to fund measures to improve survival of the other eight ESUs.
- Substantial scientific uncertainty remains regarding the likely benefits of the measure (see Section 9.7.3).
- The measure is not consistent with the intended purpose of the proposed action or within the authority and jurisdiction of the Action Agencies as is required by the regulations implementing ESA (50 CFR §402.2). Thus and thus it cannot be prescribed as an alternative action. Implementing the measure would require congressional authorization which would be made more difficult by the three issues described above; and
- The time required to authorize and implement this measure would place further risks on listed stocks.

In the RPA, NMFS has prescribed a substantial research effort to reduce the uncertainty surrounding this measure and has established a detailed adaptive management strategy with specific decision-points where this option may be revisited. If warranted by the future population trends of the Snake River ESUs and new information, NMFS would not hesitate to prescribe that the Action Agencies seek and obtain additional authority from Congress to ensure that their actions continue to avoid jeopardy and adverse modification of critical habitat.

## References

- Anderson, J. J., R. A. Hinrichsen, and C. Van Holmes. 2000. Effects of flow augmentation on Snake River Fall chinook. Attachment to letter from J. Simpson, Committee of Nine, and N. Semanko, Idaho Water Users Association, to L. Krasnow, National Marine Fisheries Service, Hydro Program, Portland, Oregon. September 29, 2000.
- Andrews, J., J. Lloyd, and B. Webster. 1987. Alturas Lake flow augmentation, final report. (Project 83-415), to Bonneville Power Administration, Portland, Oregon.
- Cooney, T. D. 2000. UCR steelhead and spring chinook salmon quantitative analysis report. Part 1: run reconstructions and preliminary assessment of extinction risk. National

---

<sup>4</sup> For the four Snake River ESUs, the effect of dam breaching in achieving the survival and recovery indicator criteria, is determined almost entirely by delayed mortality assumptions (see Section 9.7.3.2.6).

## RESPONSE TO COMMENTS

December 21, 2000

Marine Fisheries Service, Hydro Program, Technical Review Draft, Portland, Oregon.  
December 20.

Corps (U.S. Army Corps of Engineers). 1999. Lower Snake River juvenile salmon migration feasibility report/environmental impact statement. Corps, Walla Walla District, Draft Report, Walla Walla, Washington. December.

Dreher, K. J., C. R. Petrich, K. W. Neely, E. C. Bowles, and A. Byrne. 2000. Review of survival, flow, temperature, and migration data for hatchery-raised, subyearling fall chinook salmon above Lower Granite Dam, 1995-1998. Supporting documentation for letter from D. Kempthorne, Governor, State of Idaho, to B. Brown, Assistant Regional Administrator, National Marine Fisheries Service. September 29, 2000.

Federal Caucus. 2000. Conservation of Columbia basin fish; final basinwide salmon strategy. December. <<http://www.SalmonRecovery.gov>>

ISG (Independent Science Group). 1996. Return to the river: restoration of salmonid fishes in the Columbia River ecosystem. ISG, Report 96-6, for Northwest Power Planning Council, Portland, Oregon.

Kempthorne, D., M. Racicot, J. A. Kitzhaber, and G. Locke. 2000. Recommendations of the governors of Idaho, Montana, Oregon, and Washington for the protection and restoration of fish in the Columbia River. July.

Koning, C. W., and E. R. Keeley. 1997. Salmonid biostandards for estimating production benefits of fish habitat rehabilitation techniques. *In*: P. Slaney and D. Zaldokas, editors. Fish Habitat Rehabilitation Procedures. Ministry of Environment, Lands and Parks. Watershed Restoration Technical Circular 9. Vancouver, B.C.

McClure, M., B. Sanderson, E. Holmes, C. Jordan, P. Kareiva, and P. Levin. 2000. A standardized quantitative analysis of the risks faced by salmonids in the Columbia River basin. National Marine Fisheries Service, Northwest Fisheries Science Center, Cumulative Risk Initiative, Draft Report, Seattle, Washington. August 3.

Moyle, P. 1994. The decline of anadromous fishes in California. *Conservation Biology*. Vol. 8:869-870.